

FEASIBILITY STUDY

Martin Luther King, Jr. Parkway and NC 55 Proposed Interchange

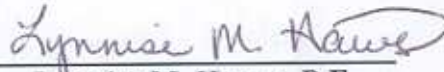
Durham County

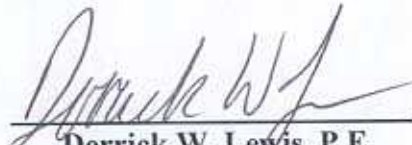
Division 5

U-2405 Re-evaluation



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I. General Description

This feasibility study describes the proposed conversion of the existing at-grade intersection at Martin Luther King, Jr. Parkway and NC 55 into an interchange or a modified at-grade intersection. Also included in this study, is the proposed multilane facility from Yorktown Avenue to SR 2028 (T.W. Alexander Drive) utilizing sections of the existing Martin Luther King, Jr. Parkway and SR 1121 (Cornwallis Road) with the remainder on new location, a distance of approximately 1.5 miles. The project location is shown on Figure 1. As part of the study, two different alternatives were investigated at the Martin Luther King, Jr. Parkway/ NC 55 intersection, the details of which are as follows:

- ♦ **ALTERNATIVE 1:** Partial clover interchange.
- ♦ **ALTERNATIVE 2:** Modified at-grade intersection.

This is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project including cost, and to identify potential problems that may require consideration in the planning and design phases.

II. Background

The purpose of this project is to provide improved east-west continuity along Martin Luther King, Jr. Parkway and improve the traffic safety and operations in the area.

Martin Luther King, Jr. Parkway is designated as a minor arterial in the North Carolina Statewide Functional Classification System and as a major thoroughfare in the 1991 City of Durham Thoroughfare Plan. Martin Luther King, Jr. Parkway is currently a four-lane divided curb and gutter section with a pavement width of 81 feet from face to face of curbs. The development along Martin Luther King, Jr. Parkway is residential and commercial.

NC 55 is designated as a principal arterial in the North Carolina Statewide Functional Classification System and as a major thoroughfare in the 1991 City of Durham Thoroughfare Plan. From Odyssey Drive to SR 1121 (Cornwallis Road), NC 55 is a four-lane divided curb and gutter section with a pavement width of 68 feet from face to face of curbs. From SR 1121 (Cornwallis Road) to Delchester Court, NC 55 is a four-lane divided shoulder section with a pavement width of 76 feet from edge of pavement to edge of pavement. The development along NC 55 is a mixture of commercial and residential including a concrete manufacturing plant between NC 55 and the CSX Transportation railway.

SR 1121 (Cornwallis Road) is designated as a minor arterial in the North Carolina Functional Classification System and as a major thoroughfare in the 1991 City of Durham Thoroughfare Plan. SR 1121 currently is a two-lane and a three-lane shoulder section with pavement widths varying from 25 to 46 feet from edge of pavement to edge of pavement. The development along NC 55 is commercial.

The following are Transportation Improvement Program (TIP) projects located within the proposed project corridor:

- TIP# R-2906: Widen NC 55- to multilanes from US 64 in Wake County to SR1121 (Cornwallis Road) in Durham County.
- TIP# U-3309: Widen SR 2028 (T. W. Alexander Drive) to a four-lane divided facility from SR 1121 (Cornwallis Road) to SR 1959 (Miami Boulevard).

There is one existing culvert within the proposed project corridor. Culvert No. 268 is a 55' wide and 40' triple 9' x 9' reinforced concrete box culvert. Culvert No. 268 was built in 1955 and has a sufficiency rating of 80.8 out of 100.

It is anticipated that the proposed route will have railroad impacts, since it will intersect the CSX Transportation's D&S Spur. At this location there is one track that carries approximately 2 freight trains per day at speeds averaging 10 miles per hour. Based on the Policies and Procedures manual, the exposure index for design year 2035 at this location would be 60,400, which surpasses the urban warrants of 30,000 for a grade separation.

III. Traffic and Safety

Several traffic signals in the proposed project corridor are located at the following intersections:

- Martin Luther King, Jr. Parkway and Yorktown Avenue
- Martin Luther King, Jr. Parkway and NC 55
- SR 1121 (Cornwallis Road) and NC 55
- SR 1121 (Cornwallis Road) and SR 1945 (S. Alston Avenue)
- SR 1121 (Cornwallis Road) and Northeast Creek Parkway
- SR 1121 (Cornwallis Road) and SR 2028 (T.W. Alexander Drive)

For the interchange alternative, the estimated current year Average Daily Traffic (ADT) along the proposed route ranges between 17,400 and 19,200 vehicles per day (vpd). For the design year 2035, the estimated traffic volume along the proposed route ranges between 32,900 and 30,100 vpd. Truck traffic is estimated to make up approximately 3 percent of the daily traffic. In the design year 2035, this alternative is projected to operate at a Level of Service (LOS) C or better.

For the at-grade intersection alternative, the estimated current year ADT along the proposed route ranges between 14,800 and 19,200 vpd. For the design year 2035, the estimated traffic volume along the proposed route ranges between 24,700 and 30,200 vpd. Truck traffic is estimated to make up approximately 3 percent of the daily traffic. In the design year 2035, this alternative is projected to operate at a LOS C or better.

Between 2004 and 2007, 32 crashes were reported along Martin Luther King, Jr. Parkway from Yorktown Avenue to NC 55. The crash rate for Martin Luther King, Jr. Parkway is 934.26 crashes per 100 million vehicle miles traveled (crashes/100MVT). This rate is significantly higher than the statewide rate of 416.14 crashes/100MVT for four-lane divided with no control access urban primary routes. There were 10 non-fatal injury crashes, 22 property damage only crashes, and no fatal crashes. The most prevalent types of crashes were Angle (34%) and Ran Off Road (22%).

Between 2004 and 2007, 68 crashes were reported along NC 55 from Odyssey Drive to SR 1121 (Cornwallis Road). The crash rate for NC 55 is 1061.55 crashes/100MVT. This rate is significantly higher than the statewide rate of 421.45 crashes/100MVT for four-lane divided with no control access urban North Carolina routes. There were 15 non-fatal injury crashes, 53 property damage only crashes, and no fatal crashes. The most prevalent types of crashes were Rear End (50%), Left Turn, (19%), and Angle (12%).

IV. Description of Alternatives

It is proposed to modify the Martin Luther King, Jr. Parkway/NC 55 intersection and construct a multilane facility from Yorktown Avenue to SR 2028 (T.W. Alexander Drive) utilizing existing sections of Martin Luther King, Jr. Parkway and SR 1121 (Cornwallis Road) with the remainder on new location, a distance of approximately 1.5 miles. The project location is shown on Figure 1.

ALTERNATIVE 1: This alternative proposes converting the existing at-grade intersection at Martin Luther King, Jr. Parkway and NC 55 into a partial clover (with ramps and loops in the west quadrants). Included in the costs below are three new bridges carrying NC 55, SR 1495 (S. Alston Avenue), and the CSX Transportation railway over the extension of Martin Luther King, Jr. Parkway, and the extension of the existing culvert at Northeast Creek.

Cross-section: Four-lane divided curb and gutter section, 81' face to face of curbs, with 12' lanes, a 23' raised grass median, 5' bicycle lanes, 5' sidewalks on both sides, and 15' berms on 150' right-of-way.

With this alternative, it is anticipated that there will be four (4) residences and two (2) businesses relocated due to this project. The total cost of this alternative, including right-of-way, utility relocation, construction, and Intelligent Transportation Systems (ITS) deployment is estimated to be \$44,750,000.

Right of Way.....	\$12,400,000
Utility Relocation.....	\$1,300,000
Construction.....	\$31,000,000
ITS Deployment.....	\$50,000
Total Cost (Alternative 1).....	\$44,750,000

In addition to the construction of the proposed partial cloverleaf interchange and multilane facility, the following improvements are recommended and included in the costs above:

- Proposed connector road from Odyssey Drive to NC 55, a distance of approximately 0.2 mile. The cross-section shall be a two-lane shoulder section with 12' lanes and 8' shoulders (4' of which are paved) on 100' right-of-way.
- Proposed realignment of SR 1121 (Cornwallis Road) from Yorktown Avenue to NC 55, a distance of approximately 0.3 mile. The new cross-section shall be a two-lane shoulder section with 12' lanes and 8' shoulders (4' of which are paved) on 100' right-of-way.
- Proposed widening of NC 55 from the proposed connector road to SR 1121 (Cornwallis Road), a distance of approximately 0.6 mile. The new cross-section shall be a four-lane divided curb and gutter section with 12' lanes, 14' outside lanes to accommodate bicycles, a 30' median for dual left turn lanes, 5' sidewalks on both sides, and 10' berms on 130' of right-of-way.
- Proposed closure of the existing at-grade railroad crossing between SR 1121 (Cornwallis Road) and the CSX Transportation railway.
- Proposed widening of Northeast Creek Parkway from SR 1945 (S. Alston Avenue) to SR 1121 (Cornwallis Road), a distance of approximately 0.2 mile. The new cross-section shall be a four-lane divided curb and gutter section with 12' lanes, a 4' raised concrete median, and 10' berms on 110' right-of-way.

ALTERNATIVE 2: This alternative proposes modifying the existing at-grade intersection at Martin Luther King, Jr. Parkway and NC 55. Included in the costs below are two new bridges carrying SR 1495 (S. Alston Avenue) and the CSX Transportation railway over the extension of Martin Luther King, Jr. Parkway, and the extension of the existing culvert at Northeast Creek.

Cross-section: Four-lane divided curb and gutter section, 81' face to face of curbs, with 12' lanes, a 23' raised grass median, 5' bicycle lanes, 5' sidewalks on both sides, and 15' berms on 150' right-of-way.

With this alternative, it is anticipated that there will be zero (0) residences and two (2) businesses relocated due to this project. The total cost of this alternative, including right-of-way, utility relocation, construction, and ITS deployment is estimated to be \$29,850,000.

Right of Way.....	\$5,200,000
Utility Relocation.....	\$1,300,000
Construction.....	\$23,300,000
<u>ITS Deployment.....</u>	<u>\$50,000</u>
Total Cost (Alternative 2).....	\$29,850,000

In addition to the proposed modification of the existing at-grade intersection and multilane facility, the following improvements are recommended and included in the costs above:

- Proposed widening of NC 55 from Odyssey Drive to SR 1121 (Cornwallis Road), a distance of approximately 0.5 mile. The new cross-section shall be a four-lane divided curb and gutter section with 12' lanes, 14' outside lanes to accommodate bicycles, a 30' median for dual left turn lanes, 5' sidewalks on both sides, and 10' berms on 150' of right-of-way.
- Proposed closure of the existing at-grade railroad crossing between SR 1121 (Cornwallis Road) and the CSX Transportation railway.
- Proposed widening of Northeast Creek Parkway from SR 1945 (S. Alston Avenue) to SR 1121 (Cornwallis Road), a distance of approximately 0.2 mile. The new cross-section shall be a four-lane divided curb and gutter section with 12' lanes, a 4' raised concrete median, and 10' berms on 110' right-of-way.

The following intersection improvements are recommended and included in the costs shown above:

- Martin Luther King, Jr. Parkway and NC 55:
 - addition of dual northbound left and right turn lanes on NC 55
 - addition of dual southbound left and right turn lanes on NC 55
 - addition of dual eastbound left and right turn lanes on Martin Luther King, Jr. Parkway
 - addition of dual westbound left and right turn lanes on Martin Luther King, Jr. Parkway
- Northeast Creek Parkway and SR 1121 (Cornwallis Road):
 - addition of northbound left and right turn lanes on Northeast Creek Parkway
 - addition of dual southbound right turn lanes on Northeast Creek Parkway
 - addition of dual eastbound left turn lanes and a right turn lane on SR 1121
 - addition of westbound left and right turn lanes on SR 1121

V. Community Issues

A detailed investigation was not conducted for this feasibility study; however no impacts to schools, parks, recreation areas, or community facilities are anticipated with this project.

VI. Natural Environment Issues

The following is a preliminary review of environmental issues that might have a potential impact to the project. The information obtained for the environmental screening is from a Geographic Information System (GIS) database. The purpose of the environmental screening is to identify potential environmental issues early in the process.

Stream Classification

The proposed project corridor is located in the Cape Fear River Basin. SR 1121 (Cornwallis Road) crosses Northeast Creek, which has a stream classification of C NSW. This water body will likely need to be surveyed and have the appropriate coordination with the North Carolina Department of Environment and Natural Resources (NCDENR) and the U.S. Army Corps of Engineers (USACE) during any environmental document study.

Wetlands

SR 1121 (Cornwallis Road) crosses wetlands associated with Northeast Creek. Permitting with the U.S. Army Corps of Engineers (USACE) will likely need to be obtained before construction of the project, and appropriate mitigation measures should be taken if deemed necessary.

Threatened and Endangered Species

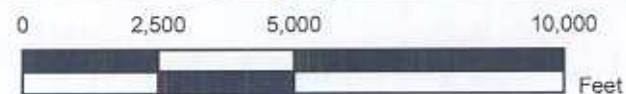
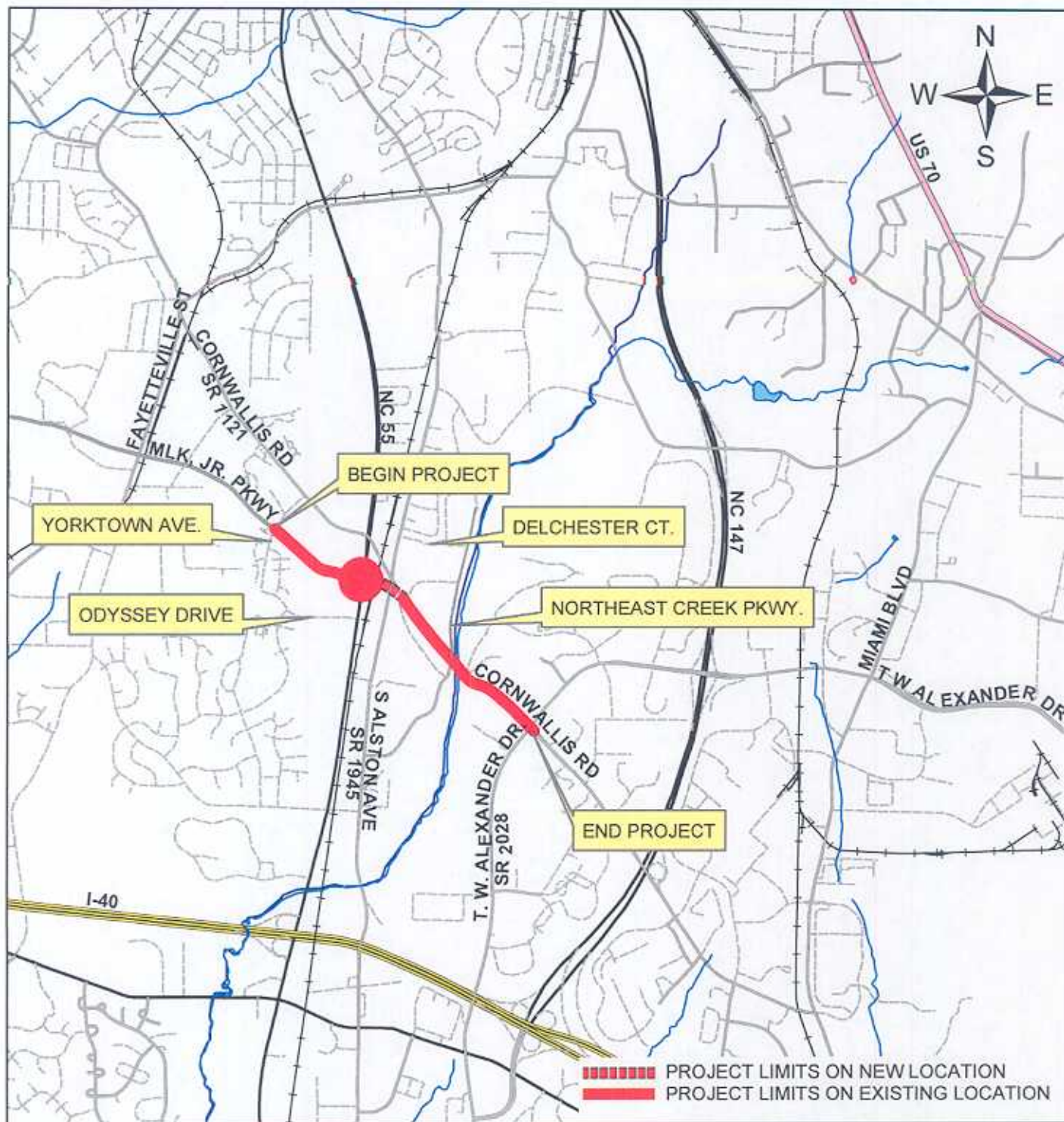
There were no threatened or endangered species identified in the proposed project corridor.

VII. Recommendations

ALTERNATIVE 1: It was found that the four-lane divided curb and gutter section with a partial cloverleaf interchange at Martin Luther King, Jr. Parkway and NC 55 would be able to accommodate the projected 2035 design year traffic volumes with an acceptable level of service, but at substantially higher costs and impacts.

ALTERNATIVE 2: It was found that the four-lane divided curb and gutter section with a modified at-grade intersection at Martin Luther King, Jr. Parkway would be able to accommodate the projected 2035 design year traffic volumes with an acceptable level of service, at substantially lower costs and impacts.

The total estimated project cost of the most cost effective Alternative 2 with a four-lane divided curb and gutter section, 12' travel lanes, a 23' raised grass median, 5' bicycle lanes, 5' sidewalks on both sides, 15' berms on 150' right-of-way, a new bridge carrying SR 1495 (S. Alston Avenue), a new bridge carrying CSX Transportation railway, the extension of the existing culvert at Northeast Creek, the widening of NC 55, the closure of the existing at-grade railroad crossing of SR 1121 and CSX Transportation railway, and the proposed widening of Northeast Creek Parkway is \$29,850,000. It is anticipated that a total of zero (0) residences and two (2) businesses will be relocated due to this alternative. However, if it is determined that Alternative 1 with a partial cloverleaf interchange should be constructed, the cost of this project would increase by \$14,900,000 to a total of \$44,750,000.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
PROGRAM DEVELOPMENT BRANCH

U-2405 RE-EVALUATION

MARTIN LUTHER KING, JR. PARKWAY AND NC 55
CONSTRUCT INTERCHANGE

DURHAM, DURHAM COUNTY

DIVISION 5

FIGURE 1